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LOVENILAMPAS, A NEW ECHINOIDEAN GENUS FROM THE CRETACEOUS OF BRAZIL

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A very remarkable echinid was described and figured by the writer in April, 1934, as *Lovenia baixadoleitensis*¹ from the Cretaceous of Baixa do Leite, State of Rio Grande do Norte, Brazil.

The genus *Lovenia*,² dedicated to Lovén, was created by Louis Agassiz and Desor, eighty-seven years ago, the genotype being *Lovenia hystrix* A. and D. But, as noted in the original description, my reference of the Brazilian Cretaceous fossil to *Lovenia* was provisional only. It was based upon the presence in the fossil of the very rare characteristic of internal cushions, hitherto known to exist only in the Miocene to Recent genus *Lovenia*, and in the living genus *Homolampas* of Alexander Agassiz.

Dr. Hubert Lyman Clark, of the Museum of Comparative Zoology, Cambridge, and Dr. Robert Tracy Jackson, the greatest authorities on the Echinodermata, find that the character of the peristome of the Brazilian fossil echinid excludes it from the genus *Lovenia*; that it cannot be a *Lovenia* nor any member of that family. Furthermore, Dr. Clark and Dr. Jackson state that there is no genus of Echinoidea, Recent or fossil, which can receive this Brazilian species. Acting therefore upon their kind advice, I am now creating the new genus **Lovenilampas**, with "*Lovenia*" *baixadoleitensis* Maury as the genotype.

I wish to express warmest appreciation of the sympathetic interest and kind and valued judgment of Dr. Clark and Dr. Jackson in the determination of the systematic position of this new genus, which is as follows:

CLASS ECHINOIDEA BRONN

ORDER **EXOCYCLOIDA** JACKSON

In the order Exocycloida, founded by Dr. Jackson,³ in 1912, the test is irregular, exocyclic, with the periproct outside of the oculo-genital ring, in interambulacrum 5. Two columns of plates lie in each

¹Maury, Carlotta J. 1934. 'Fossil Invertebrata From Northeastern Brazil,' Bulletin American Museum of Natural History, LXVII, Article IV, p. 156, Pl. xv, fig. 1.

²Agassiz and Desor, 1847. 'Annales des Sciences Naturelles,' série 3, VIII, p. 11.

³Jackson, Robert Tracy. 1912. 'Key to the Classification of the Echini. Phylogeny of the Echini with a Revision of the Paleozoic Species.' Memoirs Boston Society of Natural History, VII, p. 204.

ambulacral area and two columns of plates in each interambulacral area. Regular in form, or more frequently more or less markedly bilaterally symmetrical through the axis III, 5. Slight or no resorption of



Fig. 1. *Lovenilampas baixadoleitensis*, (Maury, 1934), gen. nov. $\times 3$. Showing the phyllodes and the remarkable coating of cushions in the interior of the test. Baixa do Leite, Rio Grande do Norte. Cretaceous. Turonian. A. M. No. 24166.

base of the corona by the advance of the peristome. Lantern present or absent. Peristomal gills, or ambulacral gills only. Sphaeridia present.

This order appeared in the Jurassic and has continued on to the Recent, being represented by living species in our modern seas. Our Brazilian new genus was a Cretaceous member of this order.

Suborder **CASSIDULINA** (Hawkins) Clark

The suborder Cassidulina was proposed by Hawkins, *in litteris*, and was adopted and published by Dr. Clark, in 1925, in his discussion of the echini in the British Museum.¹ In this suborder interambulacrum 5 is not essentially different from the others orally. The ambulacra are more or less petaloid abactinally, with pores similar and normally conjugate.

In this suborder a group of echini are embraced showing intermediate characteristics and lying on the boundary between the clypeastroids and spatangoids. In Dr. Clark's judgment, the characters of the peristome of the Brazilian fossil place it in the suborder Cassidulina.²

Family **CASSIDULIDAE** Agassiz

In the family Cassidulidae, proposed by Louis Agassiz, in 1846, the test is variable in shape. Ambulacra and interambulacra disposed to form a floscelle around the mouth by development of phyllodes and bourrelets. Periproct near or above the margin. The well developed phyllodes of our fossil point to membership in this family.

Divergent types represented by *Oligopodia* and *Echinolampas* suggest that interesting lines of interrelationship of living and extinct genera of Cassidulidae may later be traced.

As regards habit of life, members of this family are thought to use their tube feet for locomotion, and to bury themselves only to a slight extent.

The Cassidulidae appeared first in the Jurassic seas and have continued into the modern fauna. But the family is a dying one, for living species are but few.

LOVENILAMPAS, gen. nov.

The type and only species yet known of this new genus is *Lovenilampas baixadoleitensis* described and figured as *Lovenia baixadoleitensis* by the writer,³ April 9, 1934. The specimen was collected by the Inspectoria Federal de Obras Contra as Seccas of Brazil, was sent to the

¹Clark, Hubert Lyman. 1925. 'A Catalogue of the Recent Sea-Urchins (Echinoidea) in the Collection of the British Museum,' p. 179. London.

²Note.—It may here be remarked that the name *Cassidulina* was given by d'Orbigny to a foraminiferal genus, and is valid. But there is nothing in the International Code on Nomenclature that prevents the use for a suborder of a name which may be elsewhere used as a genus.

Furthermore, since the use of the name Cassidulina as a suborder is a relatively new introduction to the group of echini, and to avoid any future confusion regarding terminology, it may be stated that the genus *Cassidulus* was applied a century ago to some fossil sea urchin but was abandoned in the middle of the nineteenth century because it was supposed to conflict with *Cassidula* which had been proposed earlier. Years ago, however, the International Commission decided that *Cassidulus* was not preoccupied by *Cassidula*, and it has accordingly been restored to good and regular standing in the names of sea urchin genera. On the basis of this name Hawkins proposed the suborder Cassidulina which was adopted by Dr. H. L. Clark, in 1925.

³Maury, Carlotta J. 1934. 'Fossil Invertebrata From Northeastern Brazil.' Bulletin American Museum of Natural History, LXVII, Article IV, p. 156, Pl. xv, fig. 1.

Department of Geology and Invertebrate Palaeontology of The American Museum of Natural History, New York City, in 1925, and at the request of the Curator, Dr. Chester A. Reeds, was described by the writer. The accession number of the Brazilian collection is 1100, and the catalogue number of *Lovenilampas baixadoleitensis* is 24166, American Museum of Natural History, New York. The figure is herein reproduced.

The type specimen is a fragmentary internal mold, 25 mm. in its greatest dimension, and shows only the character of the interior of the test in the region of the peristome. The phyllodes, or bulb-like expansions of the ambulacra, as they approach the margin of the peristome are very clearly preserved. But the most striking feature is the extraordinary coating of cushions covering the inner surface of the plates of the test. These minute cushions are each about three-quarters of a millimeter in diameter and the center of each is hollowed out so that they resemble miniature air cushions of ring-like form. Apparently these internal cushions formed an intricate pneumatic device connected with the movement of the external spines.

The illustration of the type was drawn with great accuracy and beauty by Mr. George S. Barkentin of New York City.

The name *Lovenilampas* is compounded of *Lovenia* because of the internal cushions similar to those present in that genus, and the termination *lampas*¹ to conform with the termination common in the suborder Cassidulina, as in the related genera, *Echinolampas* and *Conolampas*.

Lovenilampas baixadoleitensis inhabited the Cretaceous sea of north-eastern Brazil and is the oldest echinid with internal cushions yet known.

As regards the geographical and geological range of Mesozoic Echinodermata, they are known to be present in nearly all horizons and at widely separated localities, but Clark and Twitchell² have stated that they are more numerous and characteristic in Cretaceous than in Triassic and Jurassic formations.

LOCALITY.—The type of *Lovenilampas baixadoleitensis* was collected at Baixa do Leite, southeast of Macau, State of Rio Grande do Norte, Brazil. The matrix is a whitish, siliceous material, partly chalcedonized by infiltration and replacement by aqueous solutions. The location is near the contact of the Cenozoic coastal belt with the Cretaceous limestone belt of Rio Grande do Norte.

¹The true signification is from the Greek, a torch or lamp, but there is no certainty at all that Aristotle's Lantern was present in these cassiduloids.

²Clark, W. B., and Twitchell, M. W. 1915. 'Mesozoic and Cenozoic Echinodermata of the United States.' Monographs United States Geological Survey, LIV, p. 9.

HORIZON.—The associated molluscan genus *Nerinea* proves that the Baixa do Leite formation goes with the Cretaceous belt of the State. Moreover, the presence in the same chalcedonized matrix of *Nerinea* (*Pygmatis*) *baixadoleitensis* Maury, which shows affinities with both *Nerinea* (*Pygmatis*) *requieniana* d'Orbigny and with *N. (Pygmatis)* *carentonensis* Cossmann, both from the Turonian of Châteauneuf, points to the Turonian stage. The aggregate palaeontological evidence of all fossils from the Cretaceous belt of Rio Grande do Norte is harmonious with this indication.

The age of *Lovenilampas baixadoleitensis* is thus proven to be Cretaceous, and it is tentatively referred to the Turonian stage of that period.

